

CLAIMS

What is claimed is:

1. An isolated polynucleotide encoding a polypeptide consisting of a sequence of amino acid residues selected from the group consisting of:

(a) the amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 237 (His);

(b) the amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 255 (Leu);

(c) the amino acid sequence as shown in SEQ ID NO:2 from amino acid number 256 (Lys), to amino acid number 538 (Ser);

(d) the amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 538 (Ser); and

(e) polynucleotide sequences complementary to the polynucleotides encoding the polypeptides consisting of a sequence of amino acid residues as shown in (a), (b), (c), and (d).

2. An isolated polynucleotide encoding a polypeptide consisting of an amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 237 (His), and wherein the polypeptide further comprises a biotin/avidin label, radionuclide, enzyme, substrate, cofactor, inhibitor, fluorescent marker, chemiluminescent marker, toxin, cytotoxic molecule or an immunoglobulin Fc domain.

3. An isolated polynucleotide encoding a polypeptide consisting of a sequence of amino acid residues selected from the group consisting of:

(a) the amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 237 (His);

(b) the amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 255 (Leu);

(c) the amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 538 (Ser); and

wherein the polypeptide further comprises an affinity tag, biotin/avidin label, radionuclide, enzyme, substrate, cofactor, inhibitor, fluorescent marker, chemiluminescent marker, toxin, cytotoxic molecule or an immunoglobulin Fc domain; and

wherein the polypeptide exhibits cell proliferation activity when exposed to activated CD3+ selected human T-cell conditioned media.

4. An isolated polynucleotide encoding a polypeptide consisting of a sequence of amino acid residues as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 237 (His); and

wherein the polypeptide further comprises an affinity tag, biotin/avidin label, radionuclide, enzyme, substrate, cofactor, inhibitor, fluorescent marker, chemiluminescent marker, toxin, cytotoxic molecule or an immunoglobulin Fc domain; and

wherein the polypeptide competitively inhibits cell proliferation activity of cells expressing a polypeptide comprising amino acids 20 (Cys) to amino acid number 538 (Ser) of SEQ ID NO:2 when exposed to activated CD3+ selected human T-cell conditioned media.

5. An isolated polynucleotide encoding a polypeptide consisting of a sequence of amino acid residues as shown in SEQ ID NO:2 from amino acid number 256 (Lys) to amino acid number 538 (Ser); and

wherein the polypeptide further comprises an affinity tag, biotin/avidin label, radionuclide, enzyme, substrate, cofactor, inhibitor, fluorescent marker, chemiluminescent marker, toxin, cytotoxic molecule or an immunoglobulin Fc domain; and

wherein the polypeptide has signal transduction activity.

6. The isolated polynucleotide encoding a polypeptide according to claim 1, wherein the polypeptide comprises a WSXWS motif as shown in SEQ ID NO:3.

7. The isolated polynucleotide encoding a polypeptide according to claim 1, wherein the polypeptide comprises a transmembrane domain.

8. The isolated polynucleotide encoding a polypeptide according to claim 1, wherein the transmembrane domain consists of residues 238 (Leu) to 255 (Leu) of SEQ ID NO:2.

9. The isolated polynucleotide encoding a polypeptide according to claim 1, wherein the polypeptide comprises an intracellular domain.

10. The isolated polynucleotide encoding a polypeptide according to claim 9, wherein the intracellular domain comprises residues 256 (Lys) to 538 (Ser) of SEQ ID NO:2.

11. The isolated polynucleotide encoding a polypeptide according to claim 9 wherein the intracellular domain further comprises residues 267 (Ile) to 273 (Pro) and 301 (Leu) to 304 (Gly) of SEQ ID NO:2.

12. An isolated polynucleotide encoding a polypeptide consisting of a sequence of amino acid residues selected from the group consisting of:

(a) the amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 237 (His);

(b) the amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 255 (Leu);

(c) the amino acid sequence as shown in SEQ ID NO:2 from amino acid number 256 (Lys), to amino acid number 538 (Ser);

(d) the amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 538 (Ser); and

wherein the polypeptide further comprises an affinity tag, biotin/avidin label, radionuclide, enzyme, substrate, cofactor, inhibitor, fluorescent marker, chemiluminescent marker, toxin, cytotoxic molecule or an immunoglobulin Fc domain.

13. An isolated polynucleotide encoding a polypeptide consisting of a sequence of amino acid residues as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 237 (His), and wherein the polypeptide further comprises a transmembrane from a heterologous cytokine receptor.

14. The isolated polynucleotide encoding a polypeptide according to claim 13, wherein the heterologous cytokine receptor is a class I cytokine receptor.

15. An isolated polynucleotide encoding a polypeptide consisting of a sequence of amino acid residues as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 237 (His), and wherein the polypeptide further comprises a transmembrane domain and an intracellular domain from a heterologous cytokine receptor.

16. The isolated polynucleotide encoding a polypeptide according to claim 15, wherein the heterologous cytokine receptor is a class I cytokine receptor.

17. An isolated polynucleotide encoding a polypeptide consisting of a sequence of amino acid residues as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 255 (Leu), and wherein the polypeptide further comprises an intracellular domain from a heterologous cytokine receptor.

18. The isolated polynucleotide encoding a polypeptide according to claim 17, wherein the heterologous cytokine receptor is a class I cytokine receptor.

19. An isolated polynucleotide encoding a polypeptide consisting of a sequence of amino acid residues as shown in SEQ ID NO:2 from amino acid number 256 (Lys), to amino acid number 538 (Leu), and wherein the polypeptide further comprises a transmembrane domain and a cytokine binding domain from a heterologous cytokine receptor.

20. The isolated polynucleotide encoding a polypeptide according to claim 19, wherein the heterologous cytokine receptor is a class I cytokine receptor.

21. An isolated polynucleotide encoding a polypeptide consisting of a sequence of amino acid residues as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 538 (Leu).

22. An isolated polynucleotide comprising a sequence of polynucleotides selected from the group consisting of:

- (a) a polynucleotide sequence as shown in SEQ ID NO:1;
- (b) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 1 to nucleotide 1682;
- (c) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 1 to nucleotide 779;
- (d) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 1 to nucleotide 833;
- (e) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 126 to nucleotide 2887;
- (f) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 834 to nucleotide 2887; and
- (g) polynucleotide sequences complementary to (a), (b) (c), (d), (e), and (f).

23. The isolated polynucleotide according to claim 22, wherein the polynucleotide consists of a sequence of polynucleotides selected from the group consisting of:

- (a) a polynucleotide sequence as shown in SEQ ID NO:1;
- (b) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 1 to nucleotide 1682;
- (c) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 1 to nucleotide 779;

(d) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 1 to nucleotide 833;

(e) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 126 to nucleotide 2887;

(f) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 834 to nucleotide 2887; and

(g) polynucleotide sequences complementary to (a), (b) (c), (d), (e), and (f).

24. An isolated polynucleotide consisting of a sequence of polynucleotides that is selected from the group consisting of:

(a) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 126 to nucleotide 779;

(b) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 126 to nucleotide 833;

(c) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 834 to nucleotide 1682;

(d) a polynucleotide sequence as shown in SEQ ID NO:1 from nucleotide 126 to nucleotide 1682; and

(g) polynucleotide sequences complementary to (a), (b) (c), and (d).

25. An expression vector comprising the following operably linked elements:

a transcription promoter;

a DNA segment encoding a polypeptide consisting of an amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 538 (Ser); and

a transcription terminator,

wherein the promoter is operably linked to the DNA segment, and the DNA segment is operably linked to the transcription terminator.

26. The expression vector according to claim 25, further comprising a secretory signal sequence operably linked to the DNA segment.

27. A cultured cell comprising an expression vector according to claim 25, wherein the cell expresses a polypeptide encoded by the DNA segment.

28. The cell according to claim 27, wherein the cell is dependent upon an exogenously supplied hematopoietic growth factor for proliferation.

29. The cell according to claim 28, wherein the hematopoietic growth factor is present in activated CD3+ selected human T-cell conditioned media

30. An expression vector comprising:
a transcription promoter;
a DNA segment encoding a polypeptide consisting of an amino acid sequence as shown in SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 237 (His); and
a transcription terminator,
wherein the promoter, DNA segment, and terminator are operably linked.

31. The expression vector according to claim 30, further comprising a secretory signal sequence operably linked to the DNA segment.

32. The expression vector according to claim 30, wherein the polypeptide further comprises a transmembrane from a heterologous cytokine receptor operably linked to the DNA segment.

33. The expression vector according to claim 32, wherein the heterologous cytokine receptor is a class I cytokine receptor.

34. The expression vector according to claim 30, wherein the polypeptide further comprises a transmembrane domain and an intracellular domain from a heterologous cytokine receptor.

35. The expression vector according to claim 34, wherein the heterologous cytokine receptor is a class I cytokine receptor.

36. A cultured cell into which has been introduced an expression vector according to claim 30, wherein the cell expresses a soluble receptor polypeptide encoded by the DNA segment.

37. The cell according to claim 36, wherein the cell is dependent upon an exogenously supplied hematopoietic growth factor for proliferation.

38. The cell according to claim 37, wherein the hematopoietic growth factor is present in activated CD3+ selected human T-cell conditioned media.

39. A DNA construct encoding a fusion protein, the DNA construct comprising:

a first DNA segment encoding a polypeptide consisting of a sequence of amino acid residues selected from the group consisting of:

(a) the amino acid sequence of SEQ ID NO:2 from amino acid number 1 (Met), to amino acid number 19 (Gly);

(b) the amino acid sequence of SEQ ID NO:2 from amino acid number 20 (Cys) to amino acid number 237 (His);

(c) the amino acid sequence of SEQ ID NO:2 from amino acid number 20 (Cys) to amino acid number 255 (Leu);

(d) the amino acid sequence of SEQ ID NO:2 from amino acid number 238 (Leu) to amino acid number 255 (Leu);

(e) the amino acid sequence of SEQ ID NO:2 from amino acid number 238 (Leu) to amino acid number 538 (Ser);

(f) the amino acid sequence of SEQ ID NO:2 from amino acid number 256 (Lys) to amino acid number 538 (Ser); and

(g) the amino acid sequence of SEQ ID NO:2 from amino acid number 20 (Cys), to amino acid number 538 (Ser); and

at least one other DNA segment encoding an additional polypeptide,
wherein the first and other DNA segments are connected in-frame; and
wherein the first and other DNA segments encode the fusion protein.

40. An expression vector comprising the following operably linked elements:

a transcription promoter;

a DNA construct encoding a fusion protein according to claim 39; and

a transcription terminator,

wherein the promoter is operably linked to the DNA construct, and the DNA construct is operably linked to the transcription terminator.

41. A cultured cell comprising an expression vector according to claim 40, wherein the cell expresses a polypeptide encoded by the DNA construct.

42. A method of producing a fusion protein comprising:

culturing a cell according to claim 41; and

isolating the polypeptide produced by the cell.

43. A method of producing a polypeptide comprising:

culturing a cell according to claim 25; and

isolating the polypeptide produced by the cell.

44. A method of producing a polypeptide comprising:

culturing a cell according to claim 30; and

isolating the polypeptide produced by the cell.

45. A method of producing a polypeptide comprising:
culturing a cell according to claim 36; and
isolating the polypeptide produced by the cell.